

# Outbreaks of the H1N1 Influenza in Thailand 1978\*

Prasert Thongcharoen, M.D., Dr. med.\*\*

Chantapong Wasi, M.D.\*\*

Saisunee Vanadurongwan, M.D.\*\*

Pimpan Leangpibul, M.D., D. Bact.\*\*\*

Lersuang Chavanich, M.S.\*\*\*

Yukonthorn Suworniyod, B.Sc.\*\*\*

Churairatana Nilakul, M.S.\*\*\*

Kanai Chartiyanond, M.D.\*\*\*\*

## *Epidemic Situation of the H1N1 Influenza Virus.*

On December 7, 1977, the Ministry of Health of the USSR informed the World Health Organization that several (moderate) outbreaks of influenza had occurred throughout the country. The illness was of moderate clinical severity and affected mostly children and young adults. Some strains which were isolated during the outbreaks were similar to Influenza A/Victoria/3/75 (H3N2) and Influenza A/Texas/1/77 (H3N2), but some strains were antigenically related to virus Influenza A/FM/1/47 (H1N1), the 1947 prototype strain of the H1 antigenic series. Viruses of this type were present throughout the world from 1947 to 1957 and were different from the strain of swine influenza A (HswINI). Cities reporting outbreaks included Riga, Murmansk, Kuibyshev, Poltova, Khabarovsk, Vladivostok, Leningrad and Moscow. Approximately 75 per cent of the isolated viruses were H1N1 strains and 25 per cent were H3N2 strains resembling Influenza A/Texas/1/77 and A/Victoria/3/75. Nation-wide attack rates were estimated to be approximately half that of the Asian epidemic in 1957/58 and affected mostly persons under 20 years

old(1).

In the same week, reports were also received from Hong Kong which had also affected children and young adults with moderated intensity. Again, the viruses isolated were found to be related to A/FM/1/47 (H1N1) virus(2).

On June 11, 1978, the Chinese Academy of Medical Sciences reported to the World Health Organization that during the latter half of May 1977 several influenza A (H1N1) viruses were isolated from children in the northeastern city of Tientsin and in the nearby provinces of Liaoning and Kirin. The outbreaks in China preceded the epidemics reported from the USSR. From July to October the epidemics spread southwards to many other areas of China. Clinical illness was seen most often in children and young adolescents aged from 8 to 20 years old(3).

In December 1977 the H1N1 viruses were also isolated from Taiwan and Manila(4). Since the H1N1 viruses had disappeared for more than 20 years, most of the children and adolescents born after the year 1957 had not contracted the disease and possessed

\* Supported by a Research Grant from Siriraj Foundation, 1978.

\*\* Department of Microbiology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok 7, Thailand.

\*\*\* Department of Microbiology, Faculty of Medical Technology, Mahidol University, Bangkok 7, Thailand.

\*\*\*\* Virus Research Institute, Department of Medical Sciences, Ministry of Public Health, Bangkok, Thailand.

**Table 1.** Influenza viruses isolated in Thailand from 1957 to 1976\*.

Virus strains closely related to	Prevalent period	References
A/Singapore/1/1957 (H2N2)	1957--	Vardhanabhuti, 1958(5)
A/Hong Kong/1/68 (H3N2)	1968-1972	Thongcharoen, et al., 1969**(6) Panpatana et al 1970**(7) Sarasombath et al 1971**(8)
A/England/42/72 (H3N2)	1972-1974	Panpatana et al 1973**(9)
A/Port Chalmers/1/73 (H3N2)	1973-1975	Vanadurongwan et al 1977**(10)
A/Victoria/3/75 (H3N2)	1975-1977	Vanadurongwan et al 1977**(10)

\* Before 1957 virological information was not available.

\*\* Studies done at the Division of Virology, Department of Microbiology, Faculty of Medicine, Siriraj Hospital, Mahidol University in collaboration with the National Influenza Center, Virus Research Institute Ministry of Public Health, Thailand.

no protective antibody to this virus subtype. They were, therefore, prone to be infected by the H1N1 virus. Since the authors were aware of this fact and predicted that the H1N1 outbreak would occur in Thailand, the epidemiologic and virologic studies for the coming outbreak were set up.

According to the previous studies done in this laboratory, the influenza season is prevalent in Thailand between July and October every year with various intensities. The influenza viruses isolated from patients from the previous outbreaks are listed chronologically in Table 1.

### Material and Method

#### Throat Swabs

Throat swabs were collected during the acute phase of respiratory febrile illnesses from patients with a provisional diagnosis of influenza or influenza-like illness or upper respiratory tract infection, who attended the Out-Patient Department of Siriraj University Hospital between July 1977 and May 1978. Ages of patients varied from 8 days to 12 years old. A total of 286 specimens were collected in 1977 and a total number of 169 were collected in 1978. Throat swabs were immersed into nutrient broth and were transported immediately to the Virus Laboratory in an ice thermos. Prior to virus isolation, all specimens were treated with appropriate antibiotics to get rid of

bacterial and fungal contaminations which would interfere with the virus isolation.

Two-tenth ml of each specimen was inoculated into the amniotic sac of a 9- or 10-day-old chick embryo. After 2 blind passages, any specimen of amniotic fluid showing no hemagglutinating activity was discarded and considered as negative virus isolation. Isolates were tested against polyvalent antisera of influenza A for screening. Type-specific indentifications were performed at the Virus Research Institute of the National Ministry of Public Health and were also sent to the World Influenza Center in London and to the International Influenza Center for the Americas, Atlanta, Georgia, U.S.A. for final confirmation.

#### Case Registration

Influenza is not a notifiable disease in Thailand. Case records obtained from the Division of Epidemiology, Ministry of Public Health are therefore insufficient to represent the epidemiological data in Thailand. In order to obtain more information especially in the Bangkok Metropolis area, an inquiry-form was designed, which was compiled of questions concerning house location, total number of family members including age and sex, number of influenza patients among family members (who were diagnosed by attending physicians only, not by themselves), approximate date and duration of illnesses and number of

**Table 2.** Influenza virus isolation at Siriraj Hospital 1977.

Month	No of Specimens	No positive
July	96	
August	123	
September	23	
October	32	—
November	—	—
December	—	—
Total	286	—

N.B. A/Victoria/3/1975 was isolated at the Virus Research Institute.

**Table 3.** Influenza virus isolation at Siriraj Hospital 1977.

Month	No of specimens	No positive
January	46	
February	53	5
March	33	2
April	20	—
May	17	—
Total	169	7

**Table 4.** Strains of influenza virus isolated in Bangkok 1978.

Date	Case No	Patients		Diagnosis	Influenza Virus closely related to
		age/yr.	sex		
Feb. 9, 78	1	6	female	U.R.I.	A/USSR/90/77 (H1N1)
Feb. 9, 78	2	12	male	Influenza	A/USSR/90/77 (H1N1)
Feb. 23, 78	3	3 $\frac{7}{12}$	female	Influenza	A/USSR/90/77 (H1N1)
Feb. 27, 78	4	3	female	U.R.I.	A/USSR/90/77 (H1N1)
Mar. 30, 78	5	6 $\frac{6}{12}$	male	U.R.I.	A/USSR/90/77 (H1N1)
Feb. 27, 78	6	1 $\frac{9}{12}$	male	U.R.I.	A/Texas/1/77 (H3N2)
Mar. 6, 78	7	10	male	U.R.I.	A/Texas/1/77 (H3N2)

deaths from influenza. After carefully being pre-tested, 30 000 inquiry forms were distributed to school-children in the Bangkok Metropolis from February to the end of March 1978 with the cooperation of the principals of the selected schools. All school-children were asked to take the inquiry forms to their parents for recording. If several forms were received simultaneously, the parents were asked to fill-in the form once only.

Another type of inquiry was also planned and sent to the Provincial Health Authorities and Directors of the Provincial Hospitals all over Thailand. The second type of questionnaire was aimed at getting information concerning the number, age-group predominance and period of influenza prevalence.

## Result

### 1. Influenza Virus Isolation

From July to November 1977, two hundred and eighty-six samples of throat swabs were received for virus isolation but no influenza virus was recovered. Between January and May 1978, one hundred and sixty-nine specimens were collected and 7 stains of influenza viruses were isolated by the chick embryo method. Five stains were isolated in February and 2 strains in March. For further details please refer to Table 2.

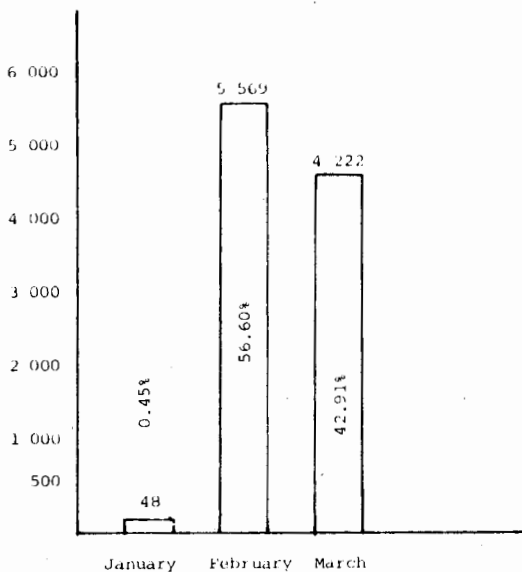
### 2. Epidemiological Informations of Influenza in Bangkok Metropolis.

Of the 30 000 inquiry forms distributed,

**Table 5.** Age and sex distribution of influenza patients, Bangkok Metropolis 1978.

Age year	Male	Female	Total	%
< 1	62	39	101	1.03
1-5	212	191	403	4.1
6-10	528	449	977	9.93
11-15	2 620	1 158	3 778	38.4
16-20	1 432	1 200	2 632	26.75
21-30	408	510	918	9.33
31-60	388	472	860	8.74
> 60	69	101	170	1.73
Total	5 719	4 120	9 839	100

Patients under 20 years old = 80.21 per cent  
 Patients over 20 years old = 19.79 per cent

**Fig 1.** Monthly distribution of influenza patients in Bangkok Metropolis, 1978.

17 032 families (56 per cent) gave adequate information for analysis. 9 832 members of 4 429 families had influenza or influenza-like illnesses while 12 603 reported none. The population census in Bangkok Metropolis (June 30, 1977) was 4 813 561 in 150 830 families. The total number of people included in the inquiry was 130 791 in 17 032 families. These figures represent 2.7 per cent of the population and 2.3 per cent of families in the Bangkok Metropolis. The attack rate of influenza calculated from the data was approximately 75 per 1 000.

**Table 6.** Duration of sickness, influenza patient Bangkok Metropolis 1978.

Number of day	Number of patient	%
1-4	3 608	78.11
5-6	541	11.71
> 6	470	10.18
	4 619	100

**Table 7.** Complications reported in the questionnaires\*.

	Number	%
Pneumonitis	83	1.87
Bronchitis	830	18.74

\* Total number of patients gave information concerning complications 4 429.

Details of the epidemiological data are presented in Table 5, 6 and 7.

Among 9 839 patients, 5 719 were male and 4 120 were female. Approximately 80 per cent of the patients (7 891 cases) were children and adolescents aged under 20 years. Most of them recovered within 4 days (78.11 per cent).

Information obtained from 4 429 cases of influenza patients revealed that 83 patients had pneumonitis and 830 cases had bronchitis. Forty-four deaths occurred among 4 429 families during the epidemic period (44 per 35 219 population.; or 0.125%), but the causes of death could not be exactly related to the influenza. Most patients were recorded in February (56.60%) and March (46.91) (Fig. 1).

#### *Incidence of Influenza Outside Bangkok Metropolis*

Out of 142 inquiries sent to the Provincial Health Authorities and Directors of the Provincial Hospitals in 71 provinces, 86 were returned from 63 provinces with adequate information for analysis. During the period from January to March 1978 patients with influenza or influenza-like diseases were reported from all provinces. Since influenza is not a

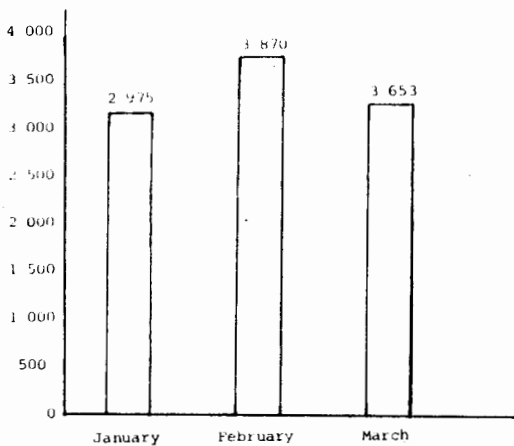


Fig 2. Monthly distribution of influenza outside Bangkok Metropolis.

notifiable disease, only 10 498 patients were recorded. Chaiyapum province in the Northeast recorded the greatest number of cases and Ayudhya in the central plain of the country ranked second. Kampangetch in the North and Sri Saket in the Northeast ranked third and fourth respectively. The ages of the patients fell predominantly in the group between 11 and 30 years old. The peak of the outbreak was reported in February (Fig. 2).

### Discussion

The spread of influenza can be divided in 3 epidemic patterns namely pandemics, epidemics and sporadic outbreaks. Pandemics, the notable global events appear to occur in association with the emergence of a new subtype of influenza A virus every 20 to 30 years. They seem to begin from a single focus, from which the disease spreads along routes of travel, progressively involving one country after another until the globe has been encircled. Attack rates in almost every country are high and tend to involve all age-groups and the mortality is usually remarkably increased. Within the past century four severe pandemics have been recorded in 1889-91, 1919-20 (swine influenza A), 1957-50 (Asian influenza H2N2), and 1968-1969 (Hong Kong influenza H3N2).

Epidemic influenza is the term applied to the relatively milder occurrence that has appeared every

few years since 1889. Attack rates seem to be lower than that of the pandemics. It appears after emergence of the new antigenic variant. It does not necessarily begin from a single focus, but may arise in many areas of the world simultaneously. Outbreaks of Influenza A/England/42/72 (H3N2) and A/Victoria/3/75 (H3N2) are good examples.

During the epidemic period, the influenza virus can be recovered from patients regularly but very rarely during the non-epidemic period. Isolation of an influenza virus strain especially a new variant or a new subtype may indicate that an outbreak or an epidemic might occur shortly thereafter. After 20 years disappearance of H1N1 virus from the epidemic scene of the world, emergence of this virus from the USSR stimulated the interest of virologists and epidemiologists around the world.

The spread of H1N1 influenza virus as expected, began in January, somewhat later than the outbreaks in Hong Kong, Taiwan and Manila. It reached its peak in February and March and tended to decline in April 1978. During the same period, however, strains of H3N2 influenza virus resembling A/Texas/1/1977 were still prevalent in Thailand as shown by Table 4. As reported in many countries, attack rates were high among children and young adults. This information might suggest that the H1N1 virus had also occurred sporadically or endemically in Thailand in 1949-1957. An unpublished serological investigation done by the authors also confirmed this statement(11). People in Thailand born after 1957 were then more susceptible to the H1N1 virus than the older age group. The disease was considered generally as mild as that of the Hong Kong influenza event in Thailand in 1968. Complications were also rare and specific death due to influenza was not reported. The authors believe that the H1N1 virus might have been isolated in Thailand for a certain period of time and after induction of the herd immunity among the young adult population the H1N1 virus might disappear within a few years.

### Summary

The H1N1 influenza viruses were isolated in China in October 1977 and in the USSR in November 1977. Since then related strains of viruses have been

identified subsequently from various parts of the world.

During the period between July 1977 and May 1978, 459 cases of influenza-like illness were studied at Siriraj Hospital. Seven strains of influenza viruses have been isolated. Five strains have been identified as closely related to influenza A/USSR/90/77 (H1N1) and other 2 strains have been identified

as closely related to influenza A/Texas/77 (H3N2). Most of the patients who yielded H1N1 influenza virus were under 20 years of age.

Informations obtained from questionnaires distributed in Bangkok Metropolis indicated that the attack rate of influenza during the 1977-78 outbreaks season was 75 per 1 000.

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*(Received for publication on March 22, 1978)*

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## การระบาดของไข้หวัดใหญ่รัสเซีย (H1N1) ในประเทศไทย พ.ศ. 2521\*

ประเสริฐ ทองเจริญ, พ.บ., Dr. med. \*\*

จันทพงษ์ ะสี, พ.บ.\*\*

สายสุณี วนตรงกัวรรณ, พ.บ.\*\*

พิมพ์พันธ์ เลียงพิบูลย์, พ.บ., D. Bact. \*\*\*

เลอสรวง ชวนิชย์, M.S. \*\*\*

บุญนทร สุวรรณยอด, พ.บ.\*\*\*

จุไรรัตน์ นิลกุล, พ.บ.\*\*\*

ชนัยชาติยานนท์, พ.บ.\*\*\*\*

ไวรัสไข้หวัดใหญ่ ได้ระบาดอยู่ในประเทศสาธารณรัฐประชาชนจีน เมื่อเดือนตุลาคม พ.ศ. 2520 และในสหภาพโซเวียต เมื่อเดือนพฤศจิกายน ศกเดียวกันต่อจากนั้นก็ระบาดต่อไปทั่วโลก

ไวรัสไข้หวัดใหญ่ H1N1 นี้เคยระบาดในโลกมาก่อนระหว่างปี พ.ศ. 2490-2500 และหลังจากนั้นก็ไม่เคยก่อให้เกิดการระบาดอีกเลย ประชากรกลุ่มที่เกิดภายหลังปี พ.ศ. 2500 จึงเป็นกลุ่มที่ขาดภูมิคุ้มกันโรคและมีโอกาสติดโรคได้มากกว่ากลุ่มอื่น

ระหว่างเดือนกรกฎาคม พ.ศ. 2520 จนถึงเดือนพฤษภาคม พ.ศ. 2521 คณะผู้รายงานได้แยกเชื้อไวรัสไข้หวัดใหญ่จากผู้ป่วยที่โรงพยาบาลศิริราช 459 รายและแยกเชื้อได้เชื้อ 7 ราย เฉพาะในปี พ.ศ. 2521 เท่านั้นเป็นไวรัสที่คล้ายกับ *Influenza A/USSR/90/77 (H1N1)* เสีย 5 ราย และคล้ายกับ *Influenza A/Texas/77 (H3N2)* อีก 2 ราย ผู้ป่วยที่ป่วยในประเทศไทยเป็นกลุ่มประชากรที่อายุต่ำกว่า 20 ปี อัตราการป่วยในกรุงเทพมหานครที่คณะได้จากการศึกษาครั้งนี้ประมาณ 75 ต่อ 1 000 โรคส่วนมากอ่อนไม่มีภาวะแทรกซ้อนที่สำคัญ

\*ได้รับทุนอุดหนุนการศึกษาจากศิริราชมูลนิธิ พ.ศ. 2521

\*\*ภาควิชาจุลชีววิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล กรุงเทพฯ 7

\*\*\*ภาควิชาจุลชีววิทยา คณะเทคนิคการแพทย์ มหาวิทยาลัยมหิดล

\*\*\*\*สถาบันวิจัยไวรัส กรมวิทยาศาสตร์การแพทย์ กระทรวงสาธารณสุข